Departments of Chemistry and Earth Sciences
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To the National Aeronautics and Space Administration

SIXTH SEMI-ANNUAL REPORT ON RESEARCH CARRIED OUT UNDER NASA GRANT No. NsG-319

For the period
March 16, 1965 to September 15, 1965

During this period, two papers were published, reporting work done in part with the support of NsG-319. Several other papers were completed or are now in an advanced stage of preparation. We have continued to tie up loose ends of previous research programs, especially in terms of the reduction of raw data to publishable form and the meaningful interpretation of such data. Progress reports on individual experimental programs are given below.

I. MEA (Multi-Element Analyses)

Chemical operations for the MEA-6 experiment have been completed. All separated samples have been checked for radiochemical purity and counted at least once. Counting of long-lived samples from this as well as previous experiments is continuing as dictated by the availability of multi-channel analyser time.

Computer reduction of all previous MEA data, using the MEGA computer program mentioned in the previous report, is in progress. This task has been proceeding more slowly than I had hoped it would, due largely to difficulties in handling some of our data which had been stored in digital form on punched paper tape. We found it necessary to read almost all of this data back into one of our multi-channel analysers, add the backgrounds which had previously been subtracted off, and repunch it, thus securing data tapes more amenable to MEGA analysis.

The MEA-7 experiment, designed to test what we hope are final modifications to our chemical procedures, will be undertaken in January, according to present plans.

II. Outgrowths of the MEA Project

Dr. L. P. Greenland, in collaboration with Prof. J. F. Lovering, has published a paper entitled "Minor and trace element abundances in chondritic meteorites" in Geochim. et Cosmochim. Acta. This work was supported in part by NsG-319. Twenty-five reprints are enclosed. The paper on "Copper and zinc abundances in chondritic meteorites" by Dr. Greenland and myself has been accepted for publication and shall appear in the December, 1965 issue of Geochim. et Cosmochim. Acta. Copies of the preprint of this paper have been transmitted to NASA; reprints shall be sent when they are available.

A paper on "Abundances of Se, Te, Ag, Pd, Cd and Zn in chondritic meteorites" by Dr. Greenland has been submitted to Geochim. et Cosmochim. Acta. Copies of the preprint of this paper were transmitted to NASA on July 20, 1965 by Prof. Suess; reprints shall be sent when available. Dr. Greenland and I are in the final stages of preparing a paper on "Abundances of Cl, Br and I in meteorites." Future work along these lines is likely to focus on analyses of mineral separates and of chondrites which, by one criterion or another, seem to be especially primitive.

III. Instrumental Activation Analyses

"Abundances of Na, Sc, Cr, Mn, Fe, Co and Cu in 218 Individual Meteoritic Chondrules via Activation Analysis, 1" was published in the May 15, 1965 issue of J. Geophys. Res. A first draft of "Elemental Abundances in Stone Meteorites," presenting our work on abundances of the seven elements listed above in 107 stone meteorites, has been completed, and Dr. R. A. Schmitt and I are awaiting critical comments from several of our colleagues to whom we have sent copies for review. Further work on mineral separates and Ca-rich achondrites is in progress, and I hope to begin writing a paper presenting this data within the next six months.

Dr. A. M. Stueber and I have completed a paper entitled "Abundances of Na, Mn, Cr, Sc and Co in ultramafic rocks," which has been submitted to Geochim. et Cosmochim. Acta. Twenty-five copies of the preprint are enclosed. Some further work along these lines will be done under NSF Grant GP-3798.

IV. Other Work

I have prepared for publication a short review article, "Geochemistry of the Precambrian Atmosphere," to be published in Encyclopedia of Earth Sciences, vol. III, edited by R. W. Fairbridge. Since this work was not supported by NsG-319, I report it only for information and shall not transmit copies.

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